REMARKS

Claims 3, 4, 8, and 9 have been canceled. Claims 2, 10, and 13 and have been amended. Support for the amendments can be found in Claims 3 and 4 and the Specification as filed, for example, on page 5, lines 5-11, page 6, lines 18-22, and 29-31, and page 10, lines 10-15. Claims 11 and 12 are withdrawn. Therefore, Claims 2, 5-7, 10, and 13 are pending. No new matter has been introduced herewith. The following addresses the substance of the Office Action.

Claim rejection under 35 U.S.C. §112

The Examiner has rejected Claims 2-10 and 13 under 35 U.S.C. §112, second paragraph as being indefinite. More specifically, the Examiner asserts that there is insufficient basis for "discrete surface regions" and requested clarification of the terms: "covalent binding" and "density". The Applicants have now canceled Claims 3, 4, 8, and 9 and amended Claim 2 to recite: "an array comprising a density of at least 4 or more discrete regions/cm^2 of solid support surface, each of said discrete surface regions being bound with a species of said DNA nucleotide sequences and wherein at least 220 fmole of DNA molecules/cm^2 are fixed to the surface of said solid support". Furthermore, the amended claim provides that the aldehyde functions are covalently bound to the capture DNA nucleotide sequences. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. §112, second paragraph.

Claim rejection under 35 U.S.C. §102

The Examiner has rejected Claims 2, 5-10, and 13 under 35 U.S.C. §102(e) as being allegedly anticipated by Wagner et al. (USP 6,329,209B1).

To be anticipatory under 35 U.S.C. § 102, a reference must teach each and every element of the claimed invention. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379 (Fed. Cir. 1986). "Invalidity for anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference. ...There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." *See Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565 (Fed. Cir. 1991).

Applicants maintain that Wagner et al. does not teach capture DNA nucleotide sequences fixed to the surface of the solid support at a density of at least 220 fmole of DNA molecules/cm^2 nor does Wagner et al. teach oxidation of olefinic groups with an aqueous solution selected from

the group consisting of an aqueous permanganate solution, an aqueuos periodate solution and an aqueous permanganate and periodate solution as claimed in now amended Claim 2. Therefore, Wagner et al. does not anticipate Clams 2, 5-10, and 13 under 35 U.S.C. §102(e), and withdrawal of the rejection is specifically requested.

Claim rejection under 35 U.S.C. §103

The Examiner has rejected Claims 2-4 under 35 U.S.C. §103(a) as being allegedly obvious over Wagner et al. (USP 6,329,209 B1) and Barner et al. (USP 5,986,066). More specifically, the Examiner believes that it would have been obvious to a person with ordinary skill in the art at the time the invention was made to include that the oxidation of the olefinic groups is performed in a permanganate and periodate solution as taught by Barner et al. in the method of Wagner et al.

To establish a *prima facie* case of obviousness a three-prong test must be met. First, there must be some suggestion or motivation, either in the references or in the knowledge generally available among those of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success found in the prior art. Third, the prior art must reference must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Like the Wagner reference, Barner et al. does not teach nor suggest capture DNA nucleotide sequences fixed to the surface of the solid support at a density of at least 220 fmole of DNA molecules/cm^2 as claimed in now amended Claim 2. Furthermore, Barner does not teach the production of an aldehyde group as an end product as recited in the claims as amended herein. Instead, Barner uses strong oxidation conditions which result in the production of a carboxylic acid as an end product. Therefore, Claim 2 as amended is non-obvious over Wagner et al. (USP 6,329,209 B1) and Barner et al. (USP 5,986,066).

The Examiner has maintained rejection of Claims 2-10 and 13 under 35 U.S.C. §103(a) as being allegedly obvious over Barner et al. (USP 5,986,066) in view of either Weetall (Applied Biochem Technol, 41:157-188, 1993) or Sundberg et al. (USP 5,624,711). More specifically, the Examiner has maintained that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of Barner et al. by including the aldehyde functional group as taught by Weetall and Sundberg et al. because it is well known that

any suitable functional group such as aldehyde, a carboxylic acid or amine can be used for immobilization of biological or chemical molecules.

Applicant maintains that the process of Barner produces an aldehyde only as a transient intermediate in a reaction which produces a carboxylic acid as an end product. It is well known in the art that the oxidative effects of potassium permanganate can be increased by either raising its temperature or its concentration. The high concentrations of potassium permanganate (2.5 mM) together with high concentration of sodium periodate (100 mM) in Barner *et al.* would cause the presence of the aldehyde in the reaction mixture to be transitory. Thus, Barner *et al.*, in fact, teaches away from the invention as claimed in the amended Claim 2, where the formation of the aldehyde functions as the end product of the mild oxidation of olefinic groups.

Furthermore, in contrast to the claimed methods in which the capture molecules are bound to the aldehyde functions, in the methods of Barner the carboxylic acid is converted into a an N-hydroxylsuccinimide ester in the presence of pyridine and the biological molecules are attached to the ester. Thus, there is no suggestion in Barner of attaching capture DNA molecules to an aldehyde group as recited in the claims as amended herein.

Weetall and Sundberg relate to methods in which biological molecules are joined to polymerized glutaraldehyde. Weetall and Sundberg do not teach the generation of aldehyde groups as an end product of mild oxidation as recited in the claims as amended herein. Furthermore, as attested in the Declaration submitted on May 27, 2003, the methods of Weetall and Sundberg, which use doubly reactive aldehyde groups, result in the two reactive groups binding to the surface of the array, rendering them unavailable for binding to a capture molecule. This reduces the density of biological molecules which can be fixed to the support. As amended herein, the claims recite that at least 220fmole of DNA molecules/cm^2 are fixed to the claimed arrays. Therefore, Applicants assert that the now amended independent Claim 2 and Claims 5-7, 10 and 13 are non-obvious over Barner et al. in view of either Weetall or Sundberg et al.

In view of the foregoing, Applicants respectfully request withdrawal of all rejections to the claims under 35 U.S.C. § 103(a).

Claim objections

The Examiner has objected to Claim 13 as being dependent on canceled Claim 1. The Applicants have amended Claim 13 to now depend on currently pending Claim 2.

CONCLUSION

In view of the foregoing, Applicants respectfully submit the present application is fully in condition for allowance. If any issues remain that may be addressed by a phone conversation, the Examiner is invited to contact the undersigned at the phone number listed below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: Feb. 5, 2007

By: Daniel Hart

Daniel Hart
Registration No. 40,637
Attorney of Record
Customer No. 20,995
(619) 235-8550

O:\DOCS\MXG\MXG-4488.DOC
012704